

Claim 1 (currently amended): A method for the purification of plasmid DNA in an aqueous two-phase system, comprising: ~~the steps of~~

- (a) providing a composition comprising including a first polymer that exhibits inverse solubility characteristics, a second polymer that is immiscible in the first polymer and, optionally, a salt;
- (b) contacting said solution composition with an aqueous solution comprising plasmid DNA;
- (c) providing a phase separation and subsequently isolating the aqueous phase;
- (d) increasing the temperature of the isolated aqueous phase to a temperature above the cloud point of the first polymer and below ~~the~~ a temperature where plasmid DNA is degraded and subsequently isolating the aqueous phase so formed; and, optionally,
- (e) performing a chromatography step to recover the plasmid DNA from the isolated top phase.

Claim 2 (currently amended): ~~A method according to~~ The method of claim 1, wherein the first polymer has a cloud point below about 60°C in the aqueous solution.

Claim 3 (currently amended): ~~A method according to~~ The method of claim 1 or 2, wherein the first polymer is selected from the group ~~that consists~~ consisting of polyalkylene glycols, poly(oxyalkylene)polymers, poly(oxyalkylene)copolymers, polyvinyl pyrrolidone, polyvinyl alcohol, polyvinyl caprolactam, polyvinyl methylether, alkoxyLATED surfactants, alkoxyLATED starches, alkoxyLATED cellulose,

alkyl hydroxyalkyl cellulose, silicone-modified polyethers, and poly N-isopropylacrylamide and copolymers thereof.

Claim 4 (currently amended): ~~A method according to any one of the preceding claims, The method of claim 1, wherein the first polymer is a copolymer comprised of including ethylene oxide and propylene oxide, preferably about 50% of ethylene oxide and about 50% of propylene oxide.~~

Claim 5 (currently amended): ~~A method according to any one of the preceding claims, The method of claim 1, wherein the second polymer is selected from the group that consists consisting of hydroxyalkyl cellulose, hydroxyalkyl starches, starch, dextran, and pullulan.~~

Claim 6 (currently amended): ~~A method according to any one of the preceding claims, The method of claim 1, wherein the weight ratio of the amounts of first polymer:second polymer is about 1:1.~~

Claim 7 (currently amended): ~~A method according to The method of claim 6, wherein the amount of the first polymer is about 4.5% (w/w) and the amount of the second polymer is about 4.5% (w/w) of the composition provided in step (a).~~

Claim 8 (currently amended): ~~A method according to any one of the preceding claims, The method of claim 1, wherein the aqueous solution that comprises includes plasmid DNA is a cell lysate, which and wherein said method further comprises a step for desalting the cell lysate before step (b).~~

Claim 9 (currently amended): ~~A method according to any one of the preceding claims,~~  
The method of claim 1, wherein the contacting according to step (b) involves mixing  
at room temperature.

Claim 10 (currently amended): ~~A method according to any one of the preceding~~  
~~claims,~~ The method of claim 1, wherein the isolation according to step (c) and/or step  
(d) is by centrifugation.

Claim 11 (original): A composition for extraction of plasmid DNA in an aqueous two-phase system, which composition comprises a first polymer that exhibits inverse solubility characteristics at temperatures below about 60<sup>0</sup>C, a second polymer that is immiscible in the first polymer and optionally a salt.

Claim 12 (currently amended): ~~A composition according to~~ The composition of claim 11, wherein the amount of the first polymer is 4.5% (w/w) and the amount of the second polymer is 4.5% (w/w).

Claim 13 (cancelled)

Claim 14 (original): A kit for purification of plasmid DNA from a cell lysate in an aqueous two-phase system, which kit comprises a first polymer that exhibits inverse solubility characteristics at temperatures below about 60<sup>0</sup>C, a second polymer that is immiscible in the first polymer and optionally a salt in one compartment as well as written instructions for the use thereof.

Claim 15 (currently amended): ~~A kit according to The kit of~~ claim 14, wherein the first polymer is comprised of ethylene oxide and propylene oxide.

Claim 16 (currently amended): ~~A kit according to The kit of~~ claim 14 or 15, wherein the second polymer is selected from the group ~~that consists~~consisting of hydroxyalkyl cellulose, hydroxyalkyl starches, starch, dextran, and pullulan.

Claim 17 (currently amended): ~~A kit according to any one of claims 14-16, The kit of~~ claim 14, wherein the weight ratio of the amounts of first polymer:second polymer is about 1:1.

Claim 18 (currently amended): ~~A kit according to any one of claims 14-17, The kit of~~ claim 14, which is for purification of a cell lysate that has been desalted before being mixed with an aqueous solution that comprises plasmid DNA.

Claim 19 (cancelled)

Claim 20 (currently amended): ~~Use~~ The use of a polymer that exhibits inverse solubility characteristics at temperatures below about 60<sup>0</sup>C in an aqueous two-phase system for the purification of plasmid DNA from a cell lysate.

Claim 21 (currently amended): ~~Use according to~~ The use of claim 20, wherein the polymer is a copolymer of ethylene oxide and propylene oxide.

**Claim 22 (new): The method of claim 4, wherein the copolymer includes about 50% propylene oxide and about 50% ethylene oxide.**